

# Mobile Decision Support Services *InteractiveNWS (iNWS)*

Improving Decision Support  
During High-Impact Events  
Using  
Mobile Communications

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RITT Forum  
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NOAA NWS WRH  
Scientific Services Division  
InteractiveNWS Team

# Agenda

- **Mobile Decision Support Services (DSS)**
  - Why does this matter to the NWS?
  - Corporate Board Decision / Directive
- **iNWS Overview**
- **Mobile DSS Vision**
  - Future iNWS Plans
- **iNWS Demo**

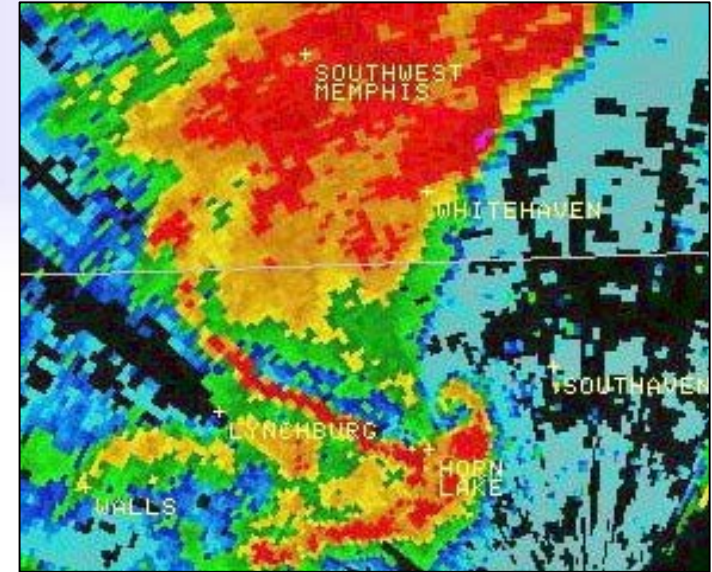


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# Social Science

## Super Tuesday Tornado Outbreak of February 5-6, 2008

87 tornadoes (5 x EF4) in 9 states causing 57 fatalities during a 12-hour period



“Several people specifically noted the need to seek confirmation of a warning...”

“...people may require multiple sources of information throughout their decision making process to assess their personal risk...”

“...a single source of information will not necessarily spur protective action.”



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# Challenges

- How can the NWS more effectively provide services that lead to better community response?



- NWS services continue to get better, but unless we improve our dissemination and communication capabilities, our effectiveness in supporting communities will be hampered
- This goal is consistent with the NWS mission of protection of life and property, and the emerging vision of improving decision support services for high-impact events

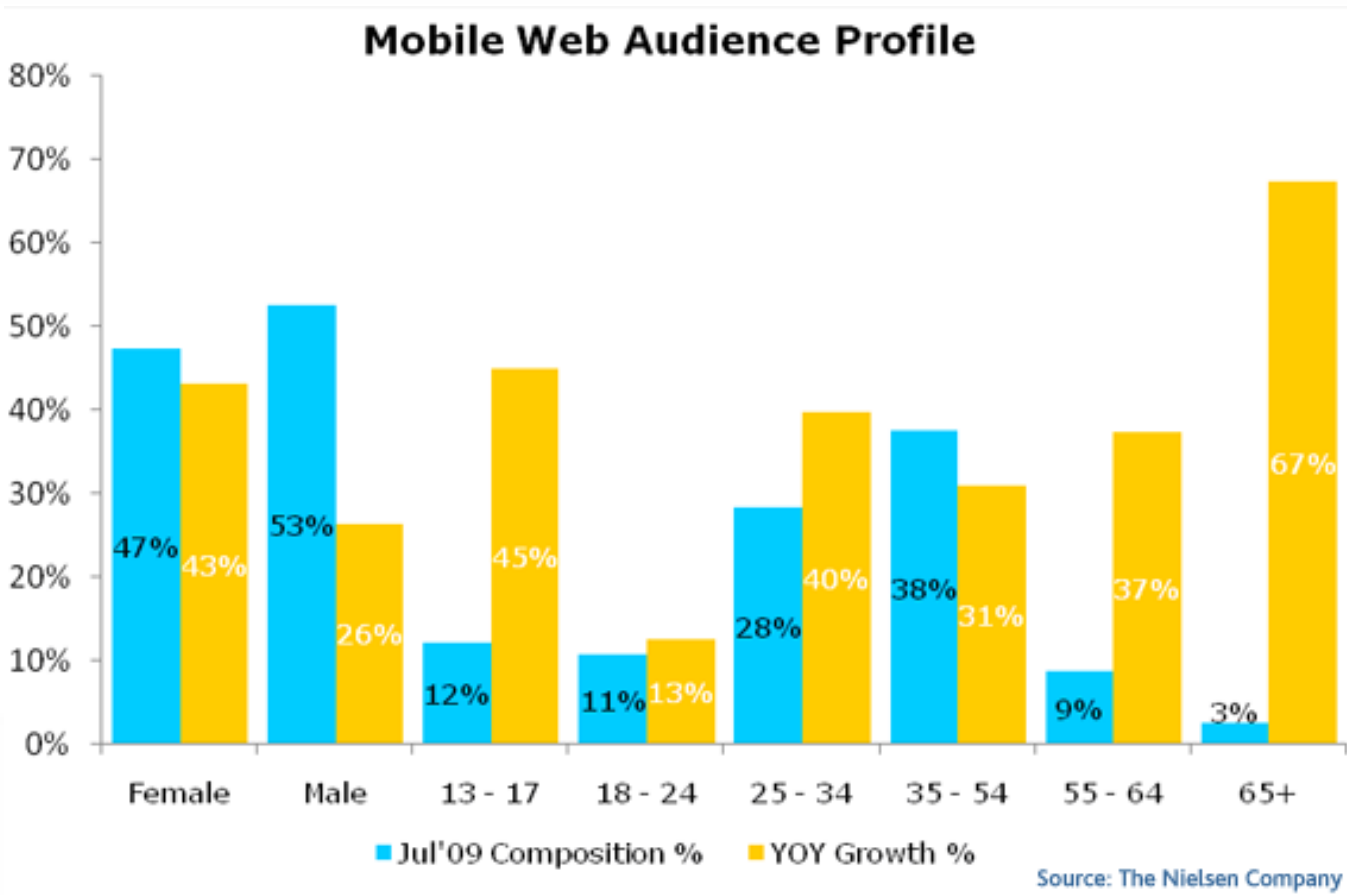
- How do we stay relevant with the technologies our partners and customers are using?



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Why is this important to the NWS?

# Women, Teens and Seniors Help Fuel 34% Mobile Web Spike



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Why is this important to the NWS?

# Our Partners need Mobile DSS

## *The world is changing!*

- Less tolerance for community leaders not being aware of impending high-impact events
- Partners becoming increasingly mobile, need for information -- anytime, anywhere
- Cell phones and PDA's with Internet access are the new communication standard



facebook

myspace

Twitter

LinkedIn

flickr

YouTube



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# Why is this important to the NWS?

- NWS is evolving from a one way dissemination paradigm (i.e. one way transmission of products and data) to a **2-way real-time interactive and collaborative environment**
- Current NWS dissemination systems are not keeping pace with consumer technologies that are being adopted
- A customer centric approach allows users to control the information they receive – ... this keeps office workload to a minimum

*“The fact is, NWS services – principally **direct interaction with decision makers** – are in greater demand than at any time in our nearly 140-year history.”*

Jack Hayes, NWS Director 2008



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# Should NWS Provide Mobile Messaging Services?

## *Partner Comments*

- “...**one more way for the NWS to save lives!** Drop the experimental and make it a permanent feature!”  
- *EM, Augusta, GA*
  - “...like radio and TV were the new notification tools of their time, SMS and e-mail are the new tools of my children. Their use will ultimately provide timely notification and save lives.” -*EM, Scandinavia, WI*
  - “This service fills a large gap in my communications network. **My tax dollars are well spent on NOAA** and return dividends that greatly exceed my investment.” - *First Responder and Trained Spotter, Wheaton, IL*
  - “Many times I am not in my office, at a computer or next to a radio. Mobile alerts have been a great and key asset for the success of our Emergency Management programs.” - *Regional Coordinator, SD Department of Public Safety*
- ▶ Invited iNWS Briefing to the Director, White House, Office of New Media, April 2009



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# Corporate Board Decision

## August 2009

- **Unanimous Board support** to develop a standardized baseline system to deliver NWS warnings and other critical decision support information to core partners on mobile devices
- The implementation process, including development of a formal project plan, O&M costs, etc., will be turned over to OST and the RITT
- Another team and/or OSIP project will be assigned to explore options for offering mobile warnings to the general public



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# Interactive NWS



***iNWS mobile services  
are designed to  
bring critical weather data  
and automatic alerts  
directly to your  
cell phone or mobile device***

<https://inws.wrh.noaa.gov>



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# iNWS Features

- **Interactive User Participation**

- Users manage their own accounts and Weather Alert profiles
- Users decide alert types, format, geography and scope

- **Dynamic Content / Device Independence**

- Content is unique and dynamic for EACH USER
- *Data* are the same NWS products and imagery on the web today!
- Users can manage content from a cell phone or desktop

- **Web Standards**

- Such as WMS, Javascript, Java, OCG, Apache, PHP

- **Scalability**

- Leverage existing Cellular provider and NWS web-farm infrastructure
- Easy to add modular features, products, and services



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# Storm Based Warning Polygons


Corporate Board request (May 2009) for guidance on optimizing the positive impact of polygon warnings

Team lead by CR; recommendations include

- Use “Elongated Pentagons”
- Increase accuracy of warnings by including storm propagation vector and climatology in designing polygons



This illustrates the need for dissemination tools that accurately and precisely leverage polygons for alerting

 iNWS is the only tool currently doing this

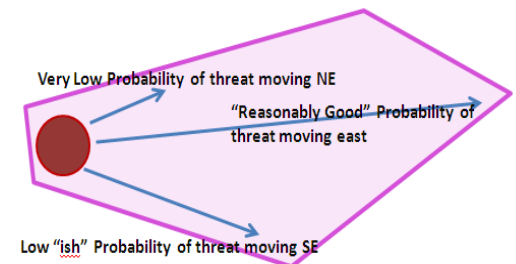


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## The “Elongated Pentagon” Polygon

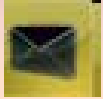
The elongated pentagon shape is meteorologically sound as a function of the probabilities of what will happen to the storm regarding:

- the storm remaining severe
- the storm movement



# iNWS Suite of Services

*Corporate Board Approved*



- **iNWS Alerts** – Text based alerts of NWS watches, warnings, and advisories using SMS and email



- **iNWS Mobile** – Mobile Java application for browsing weather data, and configuring iNWS Alerts



- **NWSChat to SMS** – Adds ability for NWS to send text messages to mobile users from NWS chat rooms



- **iNWS Mobile Web** – Weather data formatted for mobile phone web browsers



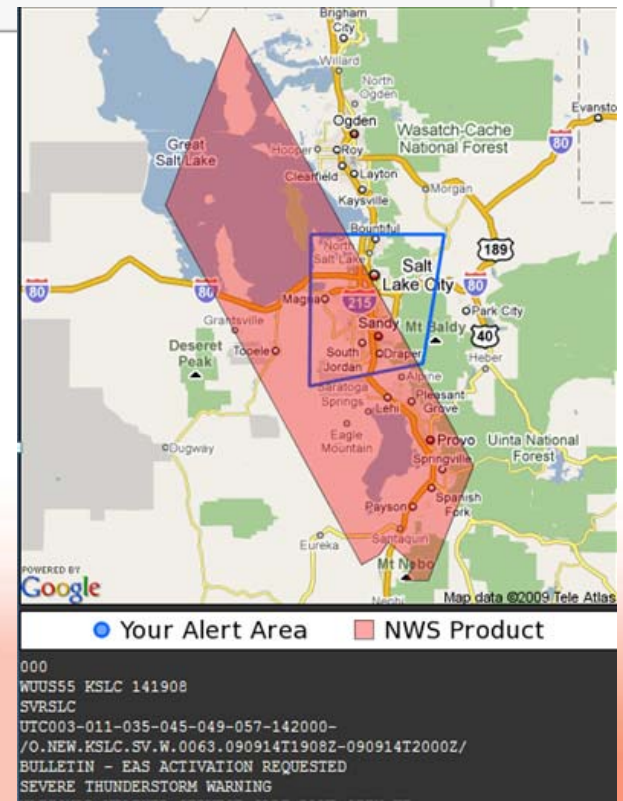
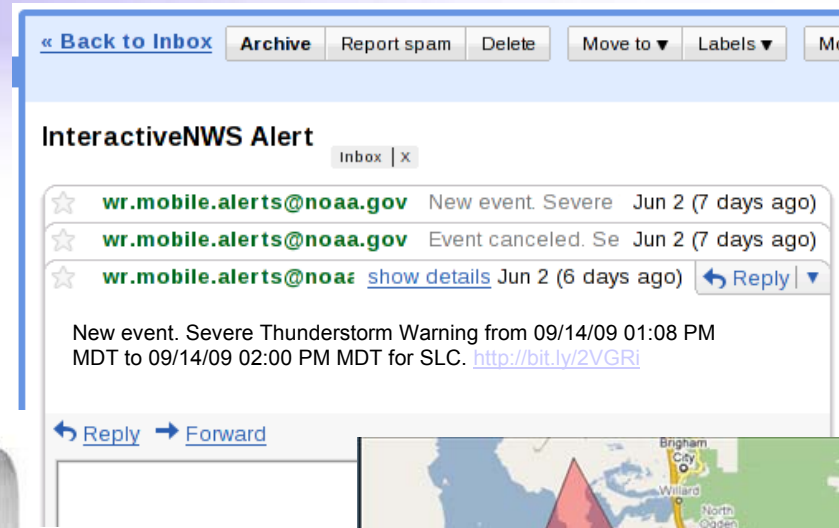
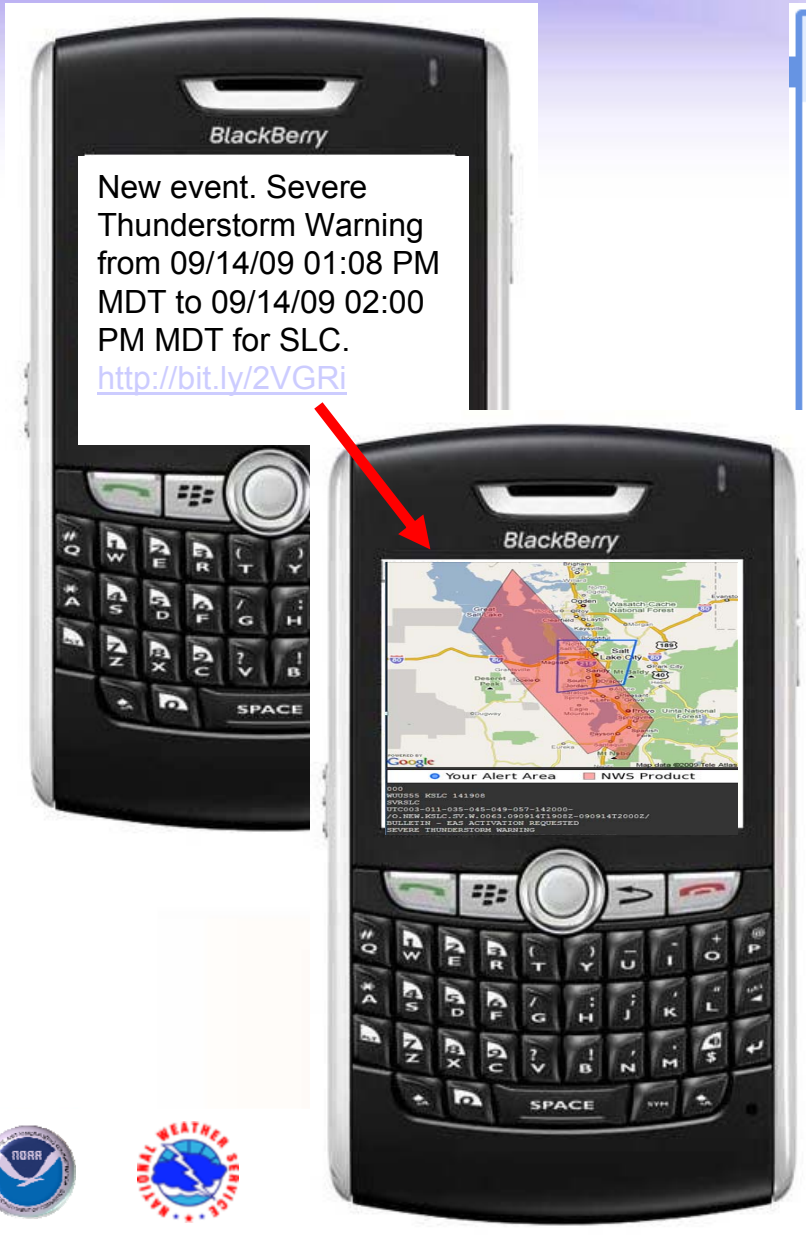
- **iCWSU** – Aviation weather data formatted for mobile phone web browsers



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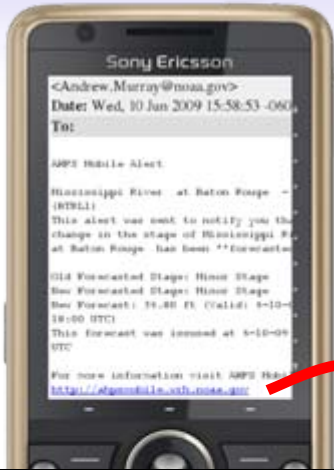
# iNWS Alerts Via Text Message or Email

- Follow the link in the message for more information



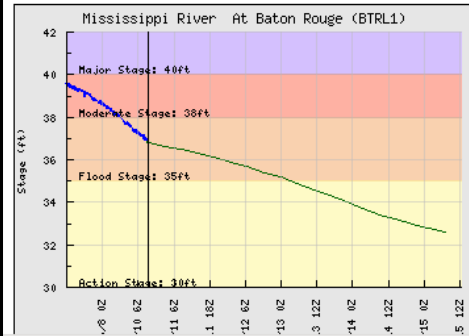
# Hydrographs and Station Observations

Hydrologic events account for the largest loss of life for any weather related phenomenon



**Subject:** AHPS Mobile Alert  
**From:** AHPS Mobile  
**Date:** 03:58 PM  
**To:** [Andrew.Murray@noaa.gov](mailto:Andrew.Murray@noaa.gov)

**AHPS Mobile Alert**  
**Mississippi River at Baton Rouge - LA (BTRL1)**  
 This alert was sent to notify you that a change in the stage of Mississippi River at Baton Rouge has been forecasted.  
**Old Forecasted Stage:** Minor  
**New Forecasted Stage:** Minor  
 New Forecast: 36.80 ft (Valid: 6-10-09 18:00 UTC)  
 Forecast Issued at: 6-10-09 10:16 UTC



**AHPS Mobile**  
 National Weather Service's Advanced Hydrological Prediction Service

[Home](#) [Forecasts](#) [News](#) [myAHPS Mobile](#) [Logout](#) [About](#)

myAHPS Mobile

**Your River Points**

**DNVC2**  
South Platte River at Denver - CO

<b>Observed</b>	<b>Forecast</b>
5.11 ft Normal Stage Valid: 6-10-09 19:45 UTC	No Current Forecast Available

[View Hydrograph](#)  
[Edit/Remove Point](#)

**1**  
Mississippi River at Baton Rouge - LA

<b>Observed</b>	<b>Forecast</b>
36.91 ft Minor Stage Valid: 6-10-09 19:00 UTC	36.80 ft Minor Stage Valid: 6-11-09 0:00 UTC

[Hide Hydrograph](#)  
[Edit/Remove Point](#)

**Mississippi River At Baton Rouge (BTRL1)**

POWERED BY Google  
Map data ©2009 Tele Atlas

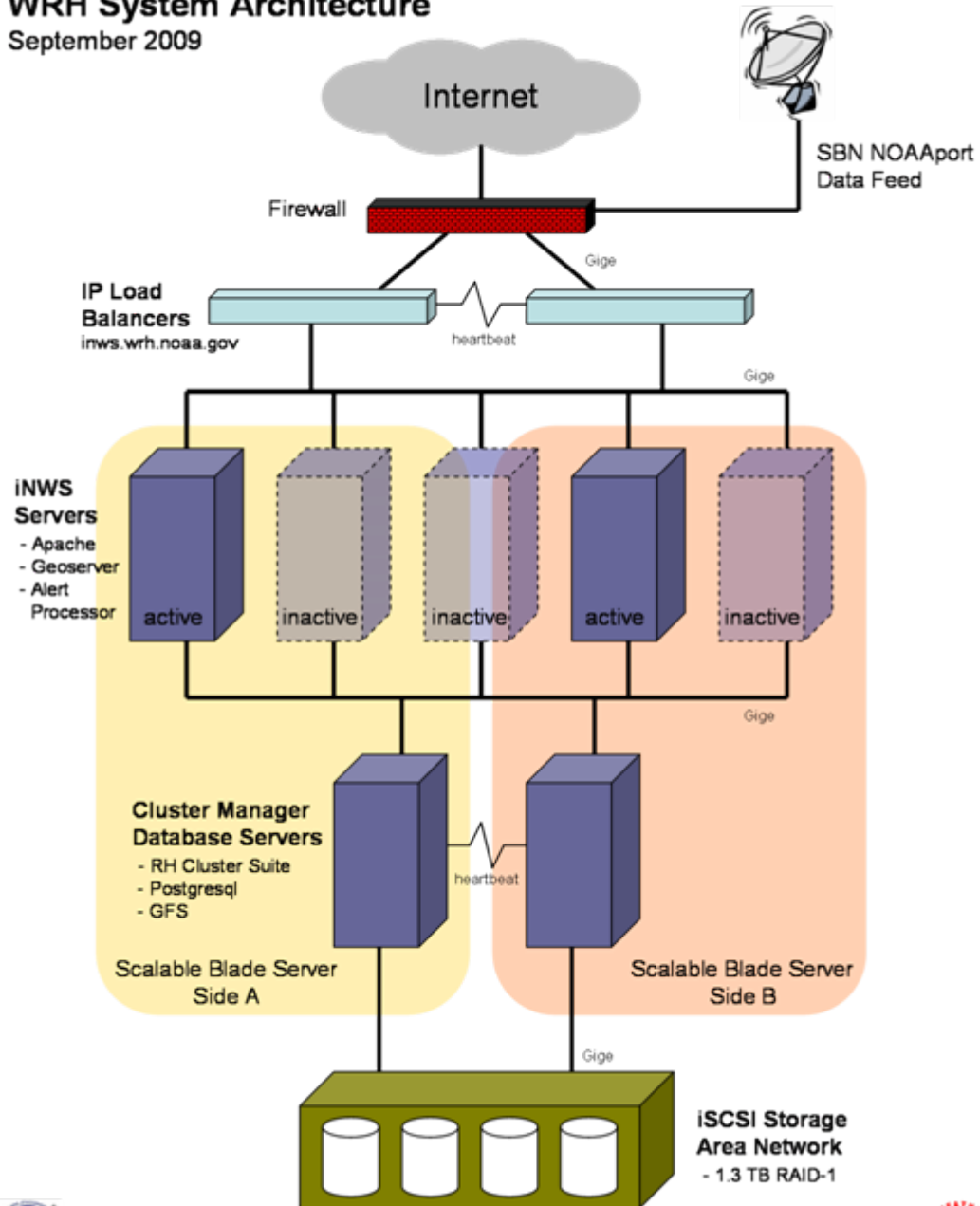
Add a New Point

Search for a point by river name



# Mobile DSS (iNWS) WRH System Architecture

September 2009





# Status of Mobile DSS (iNWS)

- At OSIP Gate 3
  - SON and Project Plan complete
  - RFP for national SMS contract pending release
  - CONOPS document in final review
- Good collaboration with OST, OCIO, OCWWS
- iNWS as pilot project for RITT
- Transition to National Operational System **2010 - 2012**



*Focused on Impacts*



# Future Plans for iNWS

## Short-Mid Range

- Integration of Hydro data and alerts **Early 2010**
- HYSPLIT data and features **January – March 2010**

## Long Range 2010 --

- Locator GPS-like Feature
- Enhanced Shortlink – more data options
- User Requested Features  
(alert scheduler, SMS or Email selector)
- Incoming Spotter Reports?



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# Financial Stimulus

## 2009 NOAA HPCC Grant

- Cell Phones, SMS Services, Multi-platform Mobile Testbed
- High Performance Storage, Postgres/PostGIS Optimization
- iNWS Developer Workshop
- ARL HYSPLIT Training



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# NWS Collaboration with NOAA Research ESRL/GSD Geo-Targeted Alerting System (GTAS)

## Integration of HYSPLIT\* data into Mobile DSS

- GTAS: NOAA-FEMA Joint Project Funded by DHS
  - High-resolution HYSPLIT model using WRF-NMM data
  - GTAS servers hosted at NWS Regional Headquarters
  - Will provide enhanced collaboration between WFOs and EOCs, including R-911, for toxic plume events

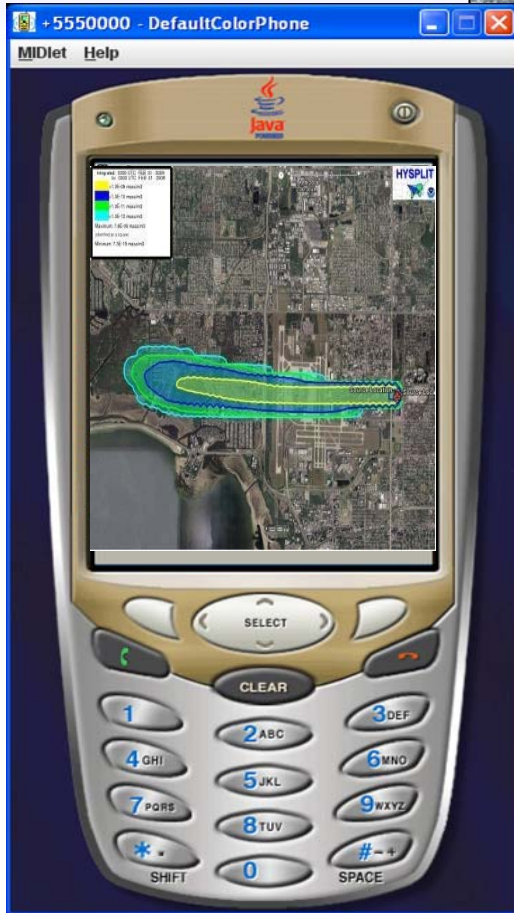
**Mobile DSS (iNWS) will enable  
real-time dissemination of HYSPLIT plume models  
to mobile devices... anytime, anywhere**



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\*HYSPLIT model developed by NOAA/ARL  
GTAS link <http://fxc.noaa.gov/GTAS/index.html>

# HYSPLIT Trajectory and Dispersion Models



... in the hands of first responders



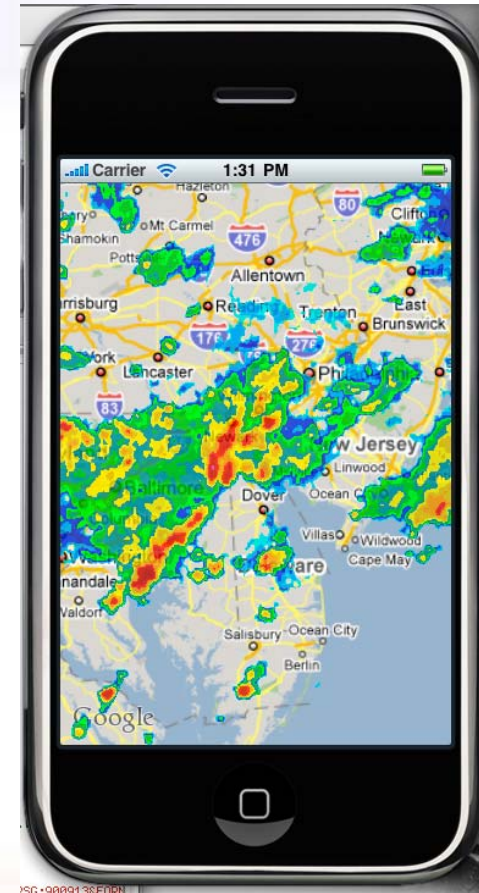
# Enhance the power behind the short-link

Alert Areas  
Warning Polygons

Plus -

RADAR  
Satellite  
Point Forecast  
Observations  
HYSPLIT

*Event/Hazard Confirmation  
to stimulate action  
eg, "Take Shelter"*



**And Other Platforms-  
iPhone, Android**



# iNWS Mobile Vision

## Four-pronged approach

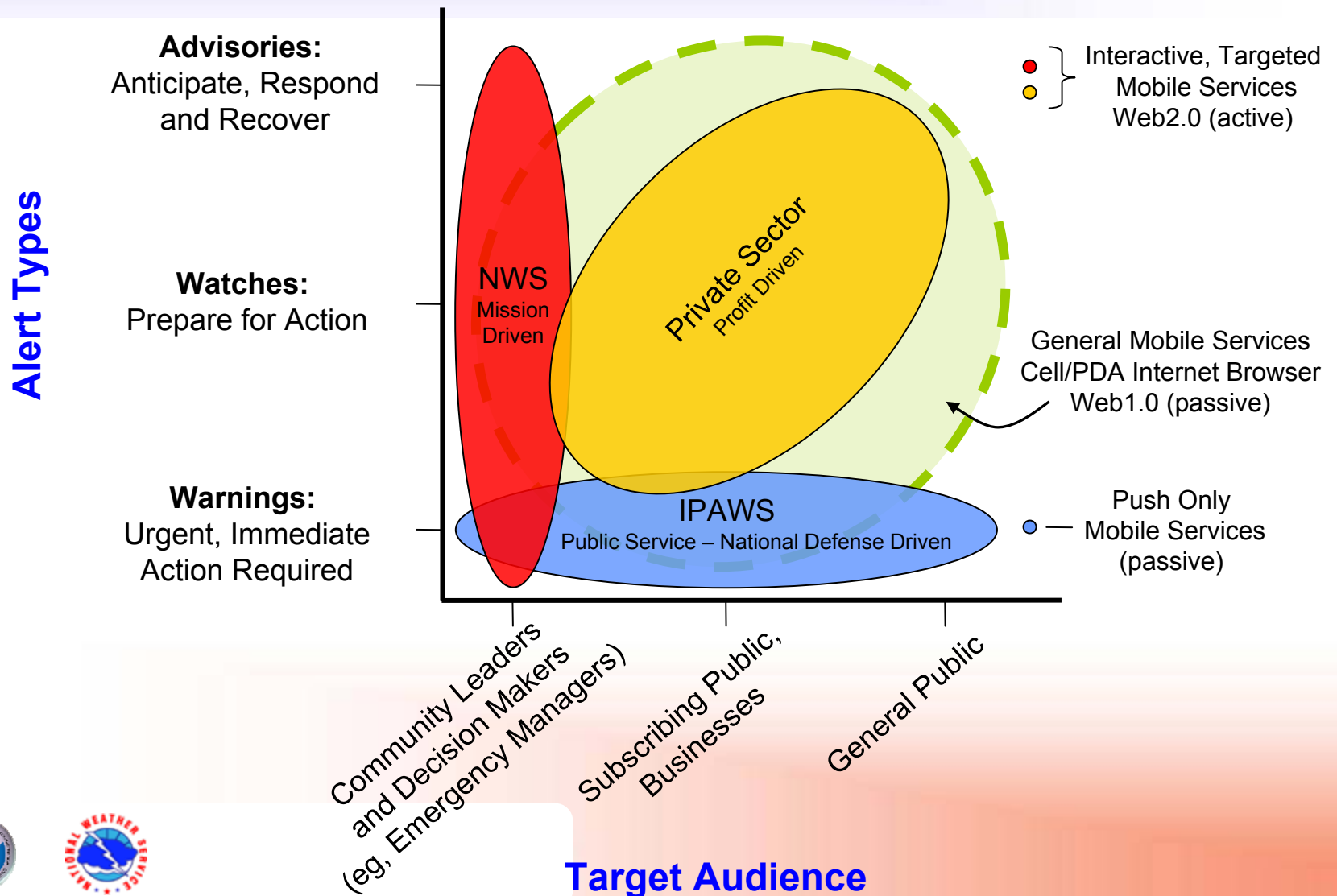
- **NWS Mobile DSS (iNWS)**
  - **Target Audience** – Community leaders and decision makers
  - **Alert Types** – Sub-catastrophic, ‘usual’ watch/warning/advisory for moderate to high-impact weather that is important to an emergency manager, for example.
- **DHS/FEMA IPAWS Commercial Mobile Alert System**
  - **Target Audience** – General Public
  - **Alert Types** – Catastrophic – used only rarely for major events  
“Reverse 911”; Cell broadcast still years away; Providers must opt-in
- **Private Sector**
  - **Target Audience** – General public, businesses
  - **Alert Types** – Value-added and custom alerts
- **General ‘pull’ Technologies** formatted for mobile
  - Web, RSS, etc



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# NWS Mobile Dissemination Vision

## Sector Relationships





# Summary

## Take-Aways for Mobile DSS (iNWS)

- The NWS Corporate Board has fully endorsed this program
- Mobile dissemination adds value to the services we already provide
- It shows that we are ready and willing to engage our users, and society, by using innovative and relevant technologies



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**Thank you. Questions?**

# iNWS Demo

## Key points to look for:

- Self registration and account management
- NWS approves or denies registration requests according to policy.
- User defined content
  - Geography
  - Weather categories
- Alert content customized for each user
- No NWS jargon
- Provide additional information using a hyperlink embedded in the alerts



# Background Slides Follow...

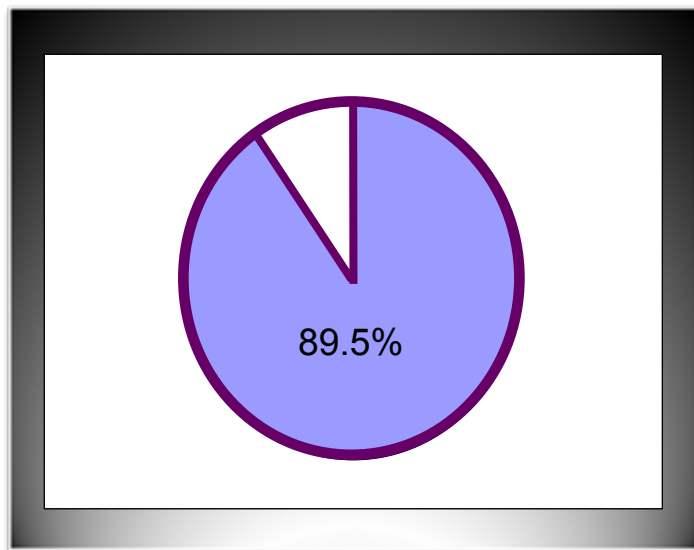


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# Should NWS Provide Mobile Messaging Services?

*Ability to Reach Communities*

% of US Population  
with Cell Phones



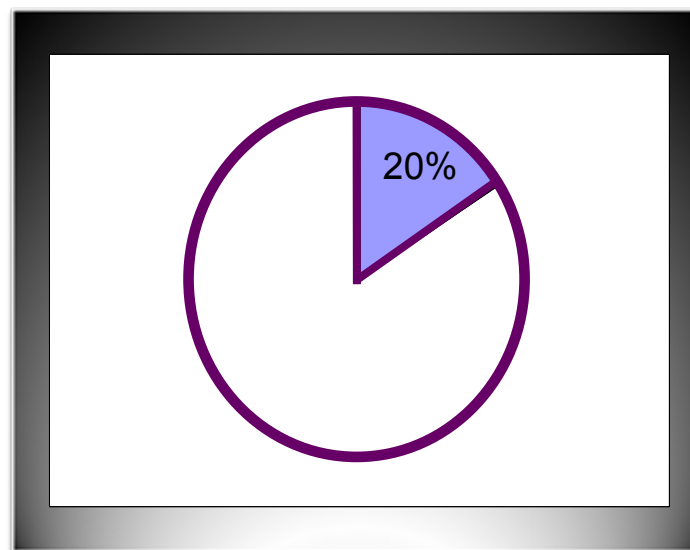
262 Million

Rapid adoption by public  
Carried by most people all the time

Infrastructure being developed  
by private sector



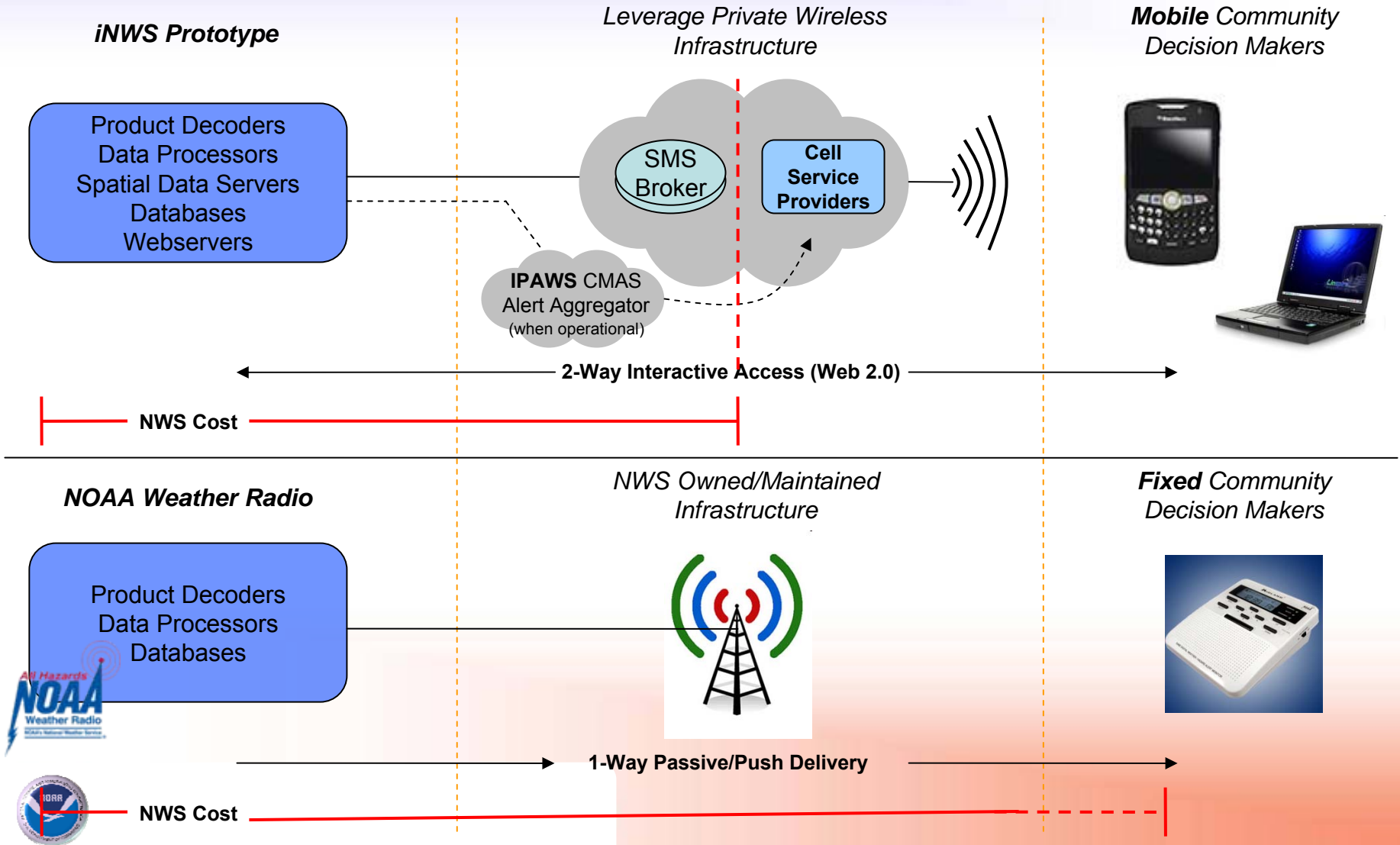
% of US Population  
with NOAA Weather Radios



60 million

Access at home or business  
Special receiver not integrated  
with general technology  
NWS responsible for infrastructure

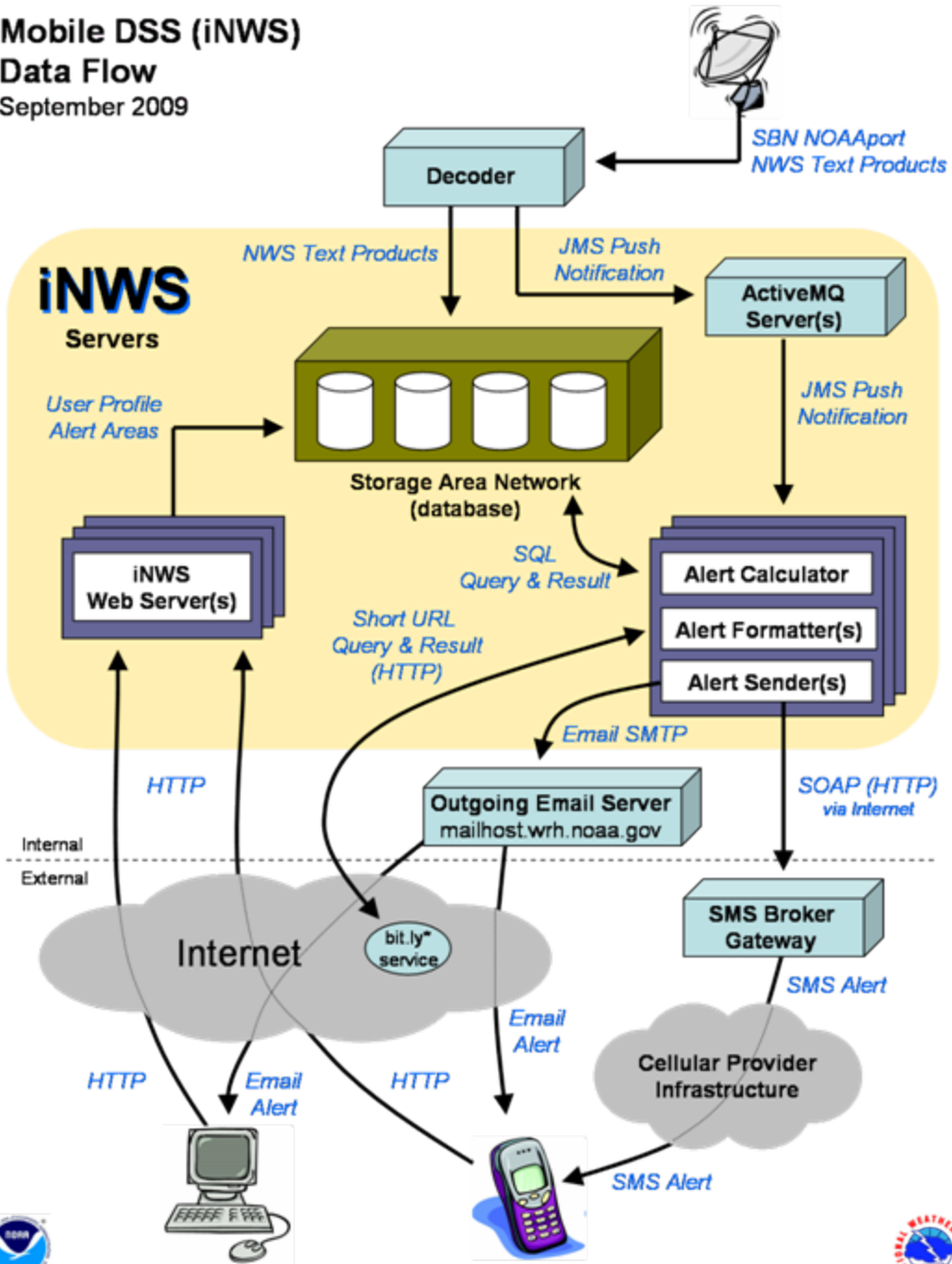
# iNWS Mobile and NWR Alerting Systems



# Mobile DSS (iNWS)

## Data Flow

September 2009



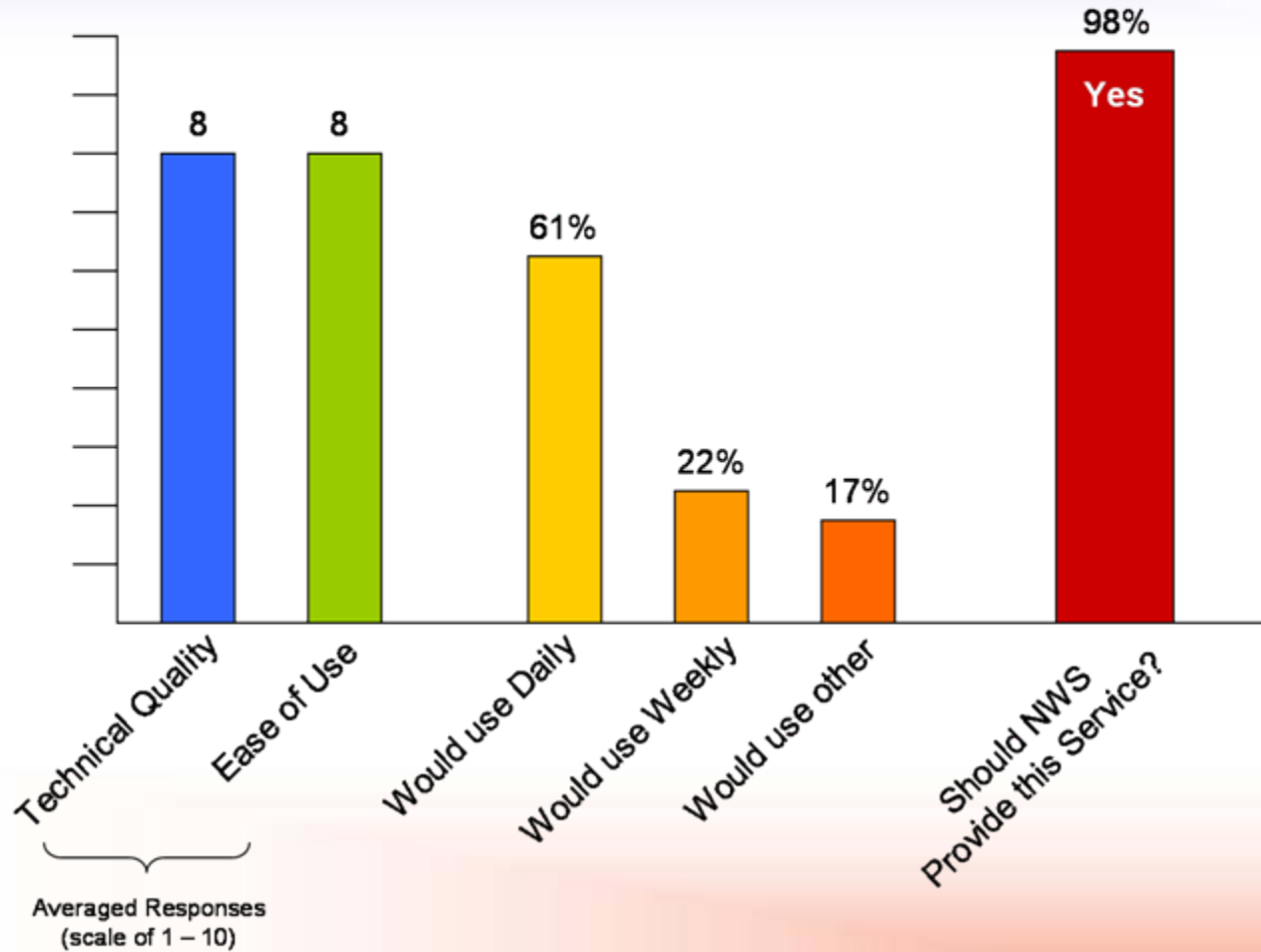
\* ( gov Short URL service pending)





# Should NWS Provide Mobile Messaging Services?

## Customer Survey Results



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